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TRANSMITTAL FORM

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Filing Date	April 21, 2000
In re Application of:	Thomas RUNKLER et al.
Group Art Unit	2172
Examiner Name	Pham, H.
Attorney Docket Number	50277-0452
Total Number of Pages in This Submission: 8	Client Docket Number: OID-1999-038-01

ENCLOSURES ***(check all that apply)***

☐ Fee Transmittal Form	☐ Assignment Papers *(for an Application)*	☐ After Allowance Communication to Group
☐ Fee Attached	☐ Drawing(s)	☐ Appeal Communication to Board of Appeals and Interferences
☐ Amendment / Response	☐ Licensing-related Papers	☒ Appeal Communication to Group *(Appeal Notice, Brief, Reply Brief)*
☐ After Final	☐ Petition Routing Slip (PTO/SB/69) and Accompanying Petition	☐ Proprietary Information
☐ Affidavits/declaration(s)	☐ To Convert a Provisional Application	☐ Status Letter
☐ Extension of Time Request	☐ Power of Attorney, Revocation Change of Correspondence Address	☐ Additional Enclosure(s) *(please identify below):*
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☐ Response to Missing Parts/ Incomplete Application	Remarks	
☐ Response to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm *or* Individual name	DITTHAVONG & CARLSON, P.C. Margo Livesay, Ph.D., Reg. No. 41,946
Signature	Margo Livesay
Date	August 15, 2005

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Alexandria, VA 22313-1450 on this date:

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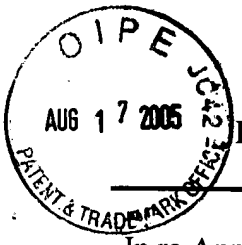

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	Thomas RUNKLER et al.	Conf. No.:	7423
Application No.:	09/553,956	Group Art Unit:	2172
Filed:	April 21, 2000	Examiner:	Pham, H.
Attorney Docket:	50277-0452		
Client Docket:	OID-1999-038-01		

For: SYSTEM AND METHOD FOR GENERATING DECISION TREES

REPLY BRIEF

Honorable Commissioner for Patents
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is submitted, in triplicate, in response to the Examiner's Answer mailed June 13, 2005.

I. ERROR IN EXAMINER'S ANSWER INDICATING THAT APPELLANTS' BRIEF DOES NOT CONTAIN A STATEMENT IDENTIFYING RELATED APPEALS AND INTERFERENCES.

As an initial matter, Appellants respectfully disagree with the statement that the "brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal." (Examiner's Answer, p. 2) Appellants respectfully submit that such a statement is included in the Appeal Brief filed January 19, 2005 on p. 1.

II. ERROR IN EXAMINER'S ANSWER INDICATING THAT CLAIMS 1-6, 10, 12-14, 16-23, 27, 29-31 AND 33-36 STAND OR FALL TOGETHER UNDER 37 CFR 1.192(c)7.

As a further initial matter, Appellants respectfully disagree with the statement that "the rejection of claims 1-6, 10, 12-14, 16-23, 27, 29-31 and 33-36 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof." (Examiner's Answer, p. 3) Appellants respectfully submit that the former provisions of 37 CFR 1.192(c)7 were "removed and reserved, 69 FR 49959, Aug. 12, 2004, effective Sept. 13, 2004." Thus, there is no requirement that Appellants' brief contain any statement regarding whether particular groups of claims stand or fall together.

III. THE EXAMINER CONTINUES TO MISCONSTRUE "MAXIMUM PARTITION COEFFICIENT" IN THE ANTICIPATION REJECTION OF CLAIMS 17 AND 34-36 OVER THE *BACKGROUND OF THE INVENTION.*

The Examiner, in the Examiner's Answer (page 21), states:

As set forth in the Manual of Patent Examining Procedure § 2111:

> during patent examination, the pending claims must be given their broadest reasonable interpretation consistent with the specification.

However, Appellants respectfully submit the Manual of Patent Examining Procedure § 2111 further states:

> The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999)

As pointed out by Appellants in the Appeal Brief filed January 19, 2005 (pp. 7-9), the Examiner's equating the recited "maximum partition coefficient" with the "information gain" mentioned in the Background section is not giving the claims "their broadest reasonable

interpretation consistent with the specification" and "consistent with the interpretation that those skilled in the art would reach." As pointed out in the Appeal Brief, even with the Examiner's excessively broad construction of "maximum partition coefficient" to be any kind of fuzzy-clustering number, the rejection's reasoning still fails. Both the **non-fuzzy ID3** and the fuzzy FID3 generate their trees by maximizing information gains (*Background*, p.4:13-14). According to the *Background*, maximizing information gains is **independent of fuzzy clustering, especially since it describes a non-fuzzy methodology, ID3**. This can be seen in a detailed discussion of information gain found in *Janikow*, at pp. 5:2–6:1, in its outline of the ID3 partitioning algorithm:

> The root of the decision tree contains all training examples. It represents the whole description space since no restrictions are imposed. Each node is recursively split by partitioning its examples. A node becomes a leaf when either its samples come from a unique class or when all attributes are used on the path. When it is decided to further split the node, one of the remaining attributes (i.e., not appearing on the current path) is selected. Domain values of that attribute are used to generate conditions leading to child nodes. The examples present in the node being split are partitioned into child nodes according to their matches to those conditions. One of the most popular attribute selection mechanisms is one that maximizes information gain [25]. This mechanism, outlined below, is computationally simple as it assumes independence of attributes.
>
> 1) Compute the information content at node N, given by $I^N = -\sum_{i=1}^{|C|}(p_i \cdot \log p_i)$, where C is the set of decisions, and p_i is the probability that a training example in the node represents class i.
>
> 2) For each attribute a_i not appearing on the path to N and for each of its domain values a_{ij}, compute the information content $I^{N|a_{ij}}$ in a child node restricted by the additional condition $a_i = a_{ij}$.
>
> 3) Select the attribute a_i maximizing the information gain $I^N - \sum_j^{|D_i|}(w_j \cdot I^{N|a_{ij}})$, where w_j is the relative weight of examples in N, and D_i is the symbolic domain of the attribute.
>
> 4) Split the node using the selected attribute.

For these reasons, one of ordinary skill in the art would not understand, based either on the *Background* or the prior art, that either ID3 or FID3 builds their decision trees using a

maximal partition coefficient. In fact, such a person of ordinary skill would not even equate a maximal partition coefficient with a maximum information gain. Well-settled case law holds that the words of a claim must be read as they would be interpreted by those of ordinary skill in the art. *In re Baker Hughes Inc.,* 215 F.3d 1297, 55 USPQ2d 1149 (Fed. Cir. 2000); *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997).

Accordingly, the anticipation rejection of claims 17 and 34-36 over the *Background* is inconsistent with how a person of ordinary skill in the art would understand either maximal partition coefficient or maximum information gain and must be reversed.

IV. THE OBVIOUSNESS REJECTION OF CLAIMS 1-6, 10, 12-14, 16, 18-23, 27, 29-31, AND 33 OVER *JANIKOW* AND OTHER APPLIED ART IS UNTENABLE.

1. The Examiner misconstrues *Janikow* as suggesting calculating "partition coefficients based on membership functions of the data" as recited in claims 10, 12, 16, 27, 29, and 33.

As pointed out in the Appeal Brief filed January 19, 2005 (p. 10), the Examiner recognizes that *Janikow* uses another measure to split the node, viz., "to calculate a plurality of information gain to the split the node." As explained above, one of ordinary skill in the art would not confuse information gain with a partition coefficient.

The Examiner apparently continues to contend that it would have been obvious "to modify the Janikow method by using function f_2 as the membership function ... in order to split a node" (Office Action dated May 20, 2004, p. 13). However, *Janikow*, p. 9, expressly teaches against just such a modification: "To define the decision procedure, we must define f_0, f_1, f_2, f_3 for dealing with samples presented for classification. These operators may **differ from those used for tree-building**—let us denote them g_0, g_1, g_2, g_3." Thus, *Janikow* discloses a distinction

between classification functions, e.g. f_2, and tree building functions, e.g. g_2, and one of ordinary skill in the art would **not** be motivated to disregard *Janikow*'s distinctions and principle of operation when making modifications of its method.

The Examiner (Examiner's Answer, p. 25) states, "the difference of the two operators is the ignoring unknown u'_j of g_0. Other than that, the two operators apply to the same values, and produce the same membership values. Therefore, the difference of operators does not affect the defined membership function." However, this discussion does not address the problem stated above by Appellants that *Janikow* discloses a distinction between classification functions, e.g. f_2, and tree building functions, e.g. g_2, and one of ordinary skill in the art would **not** be motivated to disregard *Janikow*'s distinctions and principle of operation when making modifications of its method. Thus, the rejection should be reversed.

2. The Examiner continues to misconstrue *Janikow* and *Choe et al.* in the obviousness rejection of claims 1-5 and 18-22.

In the Examiner's Answer (p. 26), the Examiner states, "As seen, membership function μ_u (V) of an attribute u represents the degree to which u belong to v is a cluster analysis." Appellants respectfully submit that one skilled in the art would not ordinarily recognize a membership function as a cluster analysis. As pointed out in the Appeal Brief filed January 19, 2005 (p. 12), *Janikow* discloses a distinction between classification functions, e.g. f_2, and tree building functions, e.g. g_2. In fact, by keeping classification and tree building distinct, *Janikow* teaches against "recursively ... performing the cluster analysis" in general and the proposed modification of *Janikow* to use *Choe et al.*'s classification system. Because of this distinction, *Janikow* actually teaches against using any classification function in *Choe et al.* for tree building (cf. claims 1 and 18: "constructing one or more arcs of the decision tree").

3. The Examiner continues to misconstrue *Janikow, Choe et al.* and *Shafer et al.* in the obviousness rejection of claims 6 and 23.

In the Examiner's Answer (p. 27), the Examiner states, "The Shafer technique, in order to have non-overlapping groups, recursively partitioning the data until each partition is either pure or sufficiently meet a requirement, e.g., a parameter set by the user, and using function value (A) < x to analyze attributes (Shafer, page 545:2 to 546:1). As seen, value (A) < x is a hard cluster analysis for building the decision tree." However, Appellants respectfully submit that one skilled in the art would not ordinarily recognize this function as a cluster analysis, much less as a hard cluster analysis.

Shafer et al., directed to a scalable parallel classifier for data mining (per title), discusses only "classes" of data and partitions of the data (e.g., p. 546, left column), and makes no mention of any "cluster analysis," much less "performing a hard cluster analysis." Furthermore, *Shafer et al.*'s different classification function does not undo *Janikow*'s teaching against the invention in claim 1, upon which claim 6 depends.

Appellants respectfully submit that the arguments submitted in the Appeal Brief filed January 19, 2005 regarding claims 13, 30, and 14 and 31 apply equally to the Examiner's comments regarding these claims in the Examiner's Answer (p. 27).

V. THE OBVIOUSNESS REJECTION OF CLAIMS 1-6 AND 18-23 OVER *RASTOGI ET AL.* AND *SHIMOJI ET AL.* IS UNTENABLE.

1. The Examiner misconstrues *Rastogi et al.* and *Shimoji et al.* in rejecting claims 1-3 and 18-22.

In the Examiner's Answer (pp. 28-29), the Examiner states, "As seen, the process of determining the least entropy as performing a cluster analysis along the selected feature to group

the data into one or more cluster, e.g., data of root node N is grouped into N_1 and N_2. The test is the salary level of the applicant is less than $20, 000.00 based on the calculated entropy describes a cluster analysis to split the node into N_1 and N_2, which are clusters." However, Appellants respectfully submit that one skilled in the art would not ordinarily recognize this test as a cluster analysis. Nowhere does *Rastogi et al.* describe "cluster analysis" or even a split based on any type of cluster analysis. In fact, *Rastogi et al.* nowhere mentions a "cluster." Thus, there is no support for the Examiner's assertion (Examiner's Answer, p. 30), that "the detail of clustering technique as taught by Shimoji is a must for Rastogi."

Appellants respectfully submit that the arguments submitted in the Appeal Brief filed January 19, 2005 regarding claims 4 and 21, 5 and 22, and 6 and 23 apply equally to the Examiner's comments regarding these claims in the Examiner's Answer (pp. 30-32).

VI. CONCLUSION AND PRAYER FOR RELIEF

Appellants, therefore, request the Honorable Board to reverse each of the Examiner's rejections.

Respectfully Submitted,

DITTHAVONG & CARLSON, P.C.

August 15, 2005
Date

Margo Livesay
Margo Livesay, Ph.D.
Attorney for Appellant(s)
Reg. No. 41,946

10507 Braddock Rd, Suite A
Fairfax, VA 22032
Tel. 703-425-8501
Fax. 703-425-8518